

Mr. Michael T. Davis Calculus	Section 2.2 Take-Home Quiz October 28, 2016
Name: <u>Answers</u>	

Answer each question without a calculator. Please DO NOT use a calculator. You have learned a lot in the past 10 weeks. You can do this. Take all the time you want. This Take-Home Quiz is Due at the start of class on Monday, October 31.

1. Evaluate $\lim_{x \rightarrow \infty} \frac{\sin x + 8x}{x} = \lim_{x \rightarrow \infty} \frac{\sin x}{x} + \lim_{x \rightarrow \infty} \frac{8x}{x} = 0 + 8 = 8$

2. Evaluate $\lim_{x \rightarrow 0} \frac{\sin x - 9x}{x} = \lim_{x \rightarrow 0} \frac{\sin x}{x} - \lim_{x \rightarrow 0} \frac{9x}{x} = 1 - 9 = -8$

3. Name the types of discontinuities of the graph of $f(x) = \frac{x^2 - 2x - 63}{x^2 - 16x + 63}$ and tell for what values of x these discontinuities exist.

$$f(x) = \frac{(x-9)(x+7)}{(x-9)(x-7)}$$

$f(x)$ has a removable discontinuity at $x=9$
and an asymptotic discontinuity at $x=7$

4. Find a simple right end behavior model for the function $f(x) = e^{-x} + 3x$

$$g(x) = 3x$$

5. Find a simple left end behavior model for the function $f(x) = e^{-x} + 3x$

$$g(x) = e^{-x}$$

6. Evaluate $\lim_{x \rightarrow \infty} \left(\frac{-5}{x^2} + 2 \right) \left(\frac{7+6\sqrt{x}}{3\sqrt{x}} \right) = (2)(2) = 4$

$$\lim_{x \rightarrow \infty} \left(\frac{-5}{x^2} + 2 \right) \left(\frac{7}{3\sqrt{x}} + 2 \right)$$

7. Write a power function end behavior model for the function $f(x) = 2x^3 - 7x + 3$

$$g(x) = 2x^3$$

8. Write a power function end behavior model for the function $f(x) = \frac{4x^2 + 3x + 1}{2x^3 - 5x - 3}$

$$g(x) = \frac{2}{x}$$

9. Write a power function end behavior model for the function $f(x) = \frac{x^4 - 9}{3x^2 - 2x + 1}$

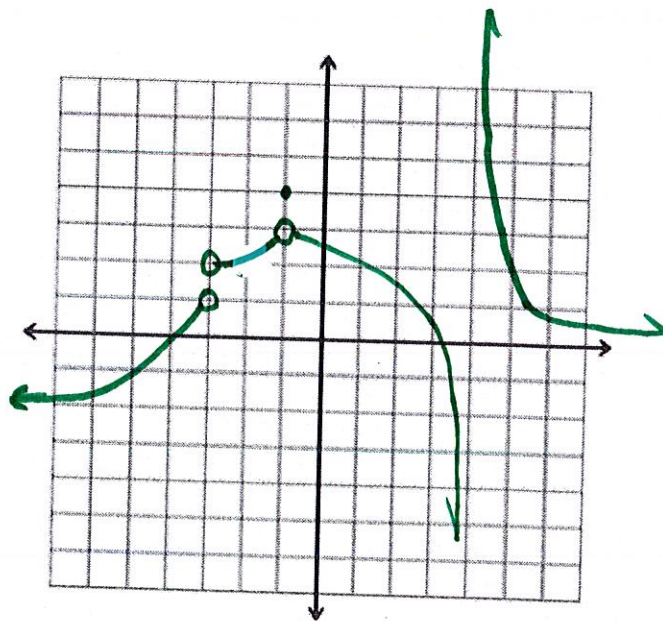
$$g(x) = \frac{1}{3}x^2$$

10. Evaluate $\lim_{x \rightarrow \infty} \left(\frac{\ln x}{e^x} \right) = 0$

11. Evaluate $\lim_{x \rightarrow -\infty} \left(\frac{\ln|x|}{e^x} \right) = \infty$

12. Sketch a graph of a function $y = f(x)$ that satisfies the stated conditions. Include any asymptotes.

Conditions: $f(-1) = 4$, $\lim_{x \rightarrow -1} f(x) = 3$, $\lim_{x \rightarrow 4^-} f(x) = -\infty$, $\lim_{x \rightarrow 4^+} f(x) = \infty$, $\lim_{x \rightarrow \infty} f(x) = 0$,
 $\lim_{x \rightarrow -3^+} f(x) = 2$, $\lim_{x \rightarrow -3^-} f(x) = 1$, & $\lim_{x \rightarrow -\infty} f(x) = -2$



OPTIONAL EXTRA CREDIT

Evaluate $\lim_{x \rightarrow 0} \frac{\sin(3x)}{x} = 3$